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ABSTRACT

A study explored 97 less proficient fifth graders' use of imagery when given oral prompts to image or general memory directions (control) and when reading explicit or implicit texts. The effects of imagery on story comprehensions and affective responses were measured by immediate and delayed story recalls, cued recall questions, and an open-ended questionnaire. Analysis of variance procedures were employed to examine treatment and story version effects. Results indicated that students use imagery spontaneously and without direction. The effects of using imagery centralized on affective responses (enjoyment of and interest in the story) and free recalls, rather than on traditional comprehension questions. Findings suggest that poor readers do image, but the effects of using imagery may be masked by traditional assessments and instructional conditions. (Contains 21 references and 5 tables of data.) (Author/RS)

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NRRC
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READING RESEARCH REPORT NO. 38
Summer 1995

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The National Reading Research Center (NRRC) is funded by the Office of Educational Research and Improvement of the U.S. Department of Education to conduct research on reading and reading instruction. The NRRC is operated by a consortium of the University of Georgia and the University of Maryland College Park in collaboration with researchers at several institutions nationwide.

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Abstract. *Explores less proficient fifth-graders (N = 97) use of imagery when given oral prompts to image or general memory directions (control) and when reading explicit and implicit texts. The effects of imagery on story comprehensions and affective responses were measured by immediate and delayed story recalls, cued recall questions, and an open-ended questionnaire. Analysis of variance procedures were employed to examine treatment and story version effects. The study found that students use imagery spontaneously and without direction. The effects of using imagery centralized on affective responses (enjoyment of and interest in the story) and free recalls, rather than on traditional comprehension questions. Poor readers do image, but the effects of using imagery may be masked by traditional asessments and instructional conditions.*

Research over the past two decades has reiterated the point that reading is an active-constructive process that demands the flexible use of both affective and cognitive strategies. Readers vary their strategies according to the text they are reading and the situation demands. Therefore, reading difficulty is not solely attributed to factors found within the reader, but rather results from an interaction among three factors: the reader, the text, and the situation (Wixson & Lipson, 1986). Thus, poor or less proficient readers may experience difficulty because they have not accessed strategies that facilitate such interactions (Purcell-Gates, 1991).

This study explored whether poor or less proficient readers use imagery, and if so, what effects such imagery has on comprehension. Paivio's dual coding theory laid much of the basis for our initial thinking because it appeared to provide a link between cognitive and affective responses. This theory maintains that "linguistic respresentations can be interpreted

in relation to other linguistic respresentations (e.g., synonyms, paraphrases, syntactic alternatives) or in relation to nonlinguistic representations of objects, events, or feelings for which they stand (e.g., images, affects)" (Sadoski, Paivio, & Goetz, 1991, p. 474). Linguistic and nonlinguistic information are represented and processed in distinct but interlinking systems (Paivio, 1986). The imaginal system deals predominantly with nonlinguistic information in the form of images which can include affective and emotional responses (Long, Winograd & Bridge, 1989; Sadoski & Quast, 1990). On the other hand, the verbal system processes information using linguistic units which are more adept in representing abstract information, contributing logic and organization to thought. Even though these systems are separate and sometimes function in a parallel way, they are also interconnected and can operate in an integrated fashion (Sadoski, Paivio, & Goetz, 1991). This perspective seemed to encompass both the affective and cognitive processes while responding to text.

Researchers have found that poor readers are less active readers and use fewer cognitive strategies than their more proficient counterparts (Kletzien, 1991; Paris & Oka, 1989). When answering comprehension questions, it was found that poor fifth-grade readers' scores on explicit questions were statistically higher than their scores for implicit questions (McCormick, 1989; McCormick, 1992). This shows that poor readers were able to restate the text but were more limited when the tasks called for them to actively manipulate information in the text. In the same vein, less proficient readers, it appears, have difficulty identifying main ideas because it requires them to make judgments about the importance of information. In an in-depth look at poor readers' inferencing strategies, McCormick (1992) found that poor readers' errors reflected inferences "generated from insignificant text-explicit statements" in relation to the question asked (p. 74). Likewise, identifying main ideas requires the consolidation of information. Younger and poorer readers have difficulty grouping ideas together while older, skilled readers "refine and revise their ideas continually while reading . . ." (Paris, Wasik, & Turner, 1991, p. 612), indicating they are actively thinking about the text.

The inferencing process not only requires thinking about various ideas in the text but also tying those ideas together using background knowledge. However, poor readers rely too heavily on background knowledge, often dismissing relevant textual ideas (Maria & MacGinitie, 1982; McCormick, 1992). It is not surprising that this process evolves when considering the reported difficulty with word recognition these readers experience. To circumvent their word identification difficulty, they learn to rely on their background knowledge instead of using both the important textual information and what they know.

While reading, poor readers have a tendency to ignore pertinent information and focus only on a few stated facts in the text. However, in order to interpret text or respond aesthetically, we make inferences, use background knowledge, and envision the text using images and emotions. This requires readers to actively respond to text, integrating information sources and response modes. When reading becomes difficult, poor readers often cease

to use strategic processes and rely on a single process rather than integrating information sources. When this single strategy doesn't work, they develop a passive response to text and tend to read without constructing meaning. This passivity may inhibit engagement and actively responding to text. Using a think-aloud approach with middle-school remedial readers, Purcell-Gates (1991) found that the six remedial readers "found it difficult to move into envisionment, and when they do, they elaborate upon it only momentarily before they again find themselves outside trying to get in" (p. 248). Often they respond to text as if they needed to answer literal, text-based questions.

Much of the literature dealing with reading disabilities assumes that an affective response to literature is unimportant to understanding text; however, recent research tends to support the assertion that readers use the affective response to understand text (Golden & Guthrie, 1986; Sadoski, Goetz & Kangiser, 1988). In Lytle's (1982) think aloud research, she found that initially students took time to evaluate their emotional response to the topic. In the Golden and Guthrie study (1986), high school students tended to view the central conflict in the plot in terms of the character they empathized with most, suggesting an association between affect and story understanding. Working with college students, Sadoski, Goetz, and Kangiser (1988) found that among the students there was remarkable agreement about what was imagined, what feelings were incited, and why a paragraph was important. However, students' reports of imagery diverged from the story, suggesting that the images may have been imported from outside the story. The imagery reports were rich and varied indicating a unique imaginative experience for each reader. In a similar investigation, Sadoski and Quast (1990) found that imagery and importance ratings were not significantly rated; however, imagery and affect had moderate to high correlations in all the stories read. In a study of fifth-grade students, Long, Winograd, and Bridge (1989) found that interest ratings were significantly associated with vividness of mental imagery and imagery reported before and after reading. However, they found no correlation between their four measures of comprehension and vividness of imagery or imagery reported before and after reading. They concluded that verbal measures of reading comprehension may be affected by controlled imagery use, but not by spontaneous imagery use. The research by Long, Winograd, and Bridge (1989) and Sadoski and Quast (1990) suggest that imagery may play an important role in making stories come to life for the reader.

Likewise, studies have indicated that imagery can be taught as a strategy to enhance comprehension. Gambrell and Bales (1986) taught fourth- and fifth-grade poor readers to use mental images to monitor their comprehension. The training resulted in increased comprehension monitoring performance. Another study found that fourth graders who received imagery training recalled significantly more information and generated a greater number of implicit ideas (Konopak, Williams, Granier, Avett, & Wood, 1991). More recently, Gambrell and Jawitz (1993) found that simply prompting fourth graders to image facilitated reading comprehension. It appears that readers

use mental imagery to help them understand and interpret text.

As indicated, research suggests that poor readers have difficulty interacting with text, using background knowledge, and using mental images; all of which are important elements of cognitive and affective responses. The purpose of this study was to investigate less proficient readers' use of mental imagery and the role of imagery in comprehending text. Specifically, the study examined the differences found among poor readers who reported using imagery and poor readers who did not report using imagery in relation to the comprehension of and affective responses to narrative stories with explicit and implicit story resolutions. The following research questions guided this study: (1) Do less proficient fifth-grade readers report using imagery when given prompts to image?; and if so, (2) What effects do reported imagery use have on story comprehension and affective responses to the story?

Method

Subjects

The study was conducted in four elementary schools; two schools in an eastern state and two schools in a northwestern state. Fifth-graders whose scores were lower than the 50th percentile on the reading portion of a standardized achievement test (in most cases the California Achievement Test) comprised the sample pool. From this pool, students who were considered poor or less proficient in reading by their classroom teachers were selected for the study, resulting in approximately 100 subjects. Students were randomly assigned to one of four treatment/text conditions: imagery/explicit resolution; imagery/implicit resolution; control/explicit resolution; and control/implicit resolution.

Materials

The reading materials used in the study consisted of two narrative stories. Each story was written in two versions which included either an explicit or implicit story resolution (text condition). The two stories varied in length; the explicit versions were slightly longer (423; 612 words) than the implicit versions (371; 548 words). Each subject read only one of the two stories. The passages were read by students in approximately 8 to 10 min.

Procedure

Subjects were assigned to one of four treatment/text conditions: imagery/explicit resolution; imagery/implicit resolution; control/explicit resolution; and control/implicit resolution. Each treatment group met with the researchers for two sessions. The first session lasted approximately 30 min. All students were told that they would be reading a story and responding to some questions about the story and about what they did while they were reading. Students were then given specific treatment directions orally. Because one of the purposes of the study was to examine whether less proficient readers could use imagery when prompted to do so, students in the imagery groups were told to make pictures or scenes in their heads about what was happening in the story. Students in the control group were given general memory directions to "try to remember

what was happening in the story." Students then read the story silently. Immediately after finishing the story, students completed an unrelated maze activity as an intervening task to eliminate the effects of short-term memory. Students then rendered a free recall, answered cued recall questions, and responded to an open-ended questionnaire designed to probe strategy use and involvement in the story. Three days later students rendered a delayed free recall during a second session lasting approximately 15 min.

Assessment & Scoring

Reading comprehension. Two reading comprehension assessment tasks were used in the study. Immediate and delayed free recalls were written by the students based on the prompt to write the story for a friend who had never read it. Depending on the treatment condition, students were also prompted to remember the pictures or scenes (imagery group) or to remember what they read (control group) as they retold the story. The free recall protocols were scored for the number of story structure elements recalled. A scoring template of important aspects of the setting, the plot episodes, and the resolution was constructed and used to evaluate the written recalls (Morrow, 1985). The written recalls were evaluated as having or not having specific story element. An interrater reliability of .93 was obtained using the rubric.

The second comprehension measure consisted of 23 cued recall questions designed to elicit textually explicit and implicit information. These recall questions were piloted in an earlier study and revised to include an approximately equal number of explicit and implicit questions. The cued recall questions were scored according to a predetermined scoring guide. Three experienced teachers generated acceptable responses to the cued recall questions. Only those answers where there was 100% agreement across the three raters were scored as correct. Those answers considered correct were given a score of 1 while answers scored as incorrect received a 0.

Imagery use & reading affect. Students also responded to an open-ended questionnaire designed to probe strategy use and involvement in the story. Given oral directions from the researchers, students circled a response from four choices indicating whether they enjoyed the story. Students then answered four questions related to imagery use during reading and the perceived benefits from such use. They were asked the following questions: (1) Did you make any pictures in your head while reading the story?; (2) If you did make pictures in your head about the story, did you make a lot of pictures, some pictures, just a few pictures, or you did not make pictures; (3) Do you think that making pictures in your head helps you to better understand what you are reading?; and (4) Do you think that making pictures in your head helps you to enjoy what you are reading?

Data Analysis

The preliminary analysis was a 2 (treatment) × 2 (story) × 2 (version) analysis of variance (ANOVA) procedures for the number

Table 1. Means and Standard Deviations for Cued Recall and Story Structure Elements-S.S.E. Immediate and Delayed

	Cued Recall	S.S.E. Immediate	S.S.E. Delayed
Imagery/Explicit Story Resolution (n = 24)	15.28 (4.89)	11.60 (3.20)	10.16 (4.98)
Imagery/Implicit Story Resolution (n = 23)	14.88 (3.26)	11.00 (2.92)	10.0 (4.27)
Control/Explicit Story Resolution (n = 24)	15.12 (3.98)	11.53 (2.91)	10.76 (3.77)
Control/Implicit Story Resolution (n = 26)	15.09 (4.00)	11.50 (2.71)	7.17 (4.95)

of correct responses to the cued recall questions and the number of story structure elements reflected in the free recall protocols for the stories. When appropriate, the Tukey HSD multiple comparison procedure was employed to identify the source of significant differences. A second analysis was conducted using a two-way multivariate analysis of variance (MANOVA) to examine treatment (imagery/control) and story version (explicit/implicit resolution) factors. The dependent variables in this analysis were the reported imagery use and open-ended questions related to reading affect. Post hoc analyses were conducted to identify areas of significance and isolate interactions.

Results

The means and standard deviations for the treatment groups on the cued recall, immediate free recall, and delayed free recall measures are provided in Table 1. There were no statistically significant differences between the imagery and control groups who read the implicit story resolution text on the cued and free recall tasks. On the delayed free recall of story structure elements, the imagery/explicit, imagery/implicit, and control/explicit groups were superior to the control/implicit group (F = 3.35; df = 3, p = $<.05$). Post hoc analysis using story resolution scores (partial

Table 2. Means and Standard Deviations for Treatment (imagery, control) and Story Conditions (explicit, implicit resolution) Across Three Measures

	Imagery-Use Measures		
(Possible Totals)	Reported Images (3.0)	Helpfulness of Imagery (4.0)	Story Enjoyment (4.0)
Imagery/Explicit Story Resolution (n = 24)	2.875 (1.04)	2.875 (1.15)	2.833 (.963)
Imagery/Implicit Story Resolution (n = 23)	2.957 (.767)	3.522 (.593)	3.478 (.593)
Control/Explicit Story Resolution (n = 24)	2.625 (1.21)	3.083 (1.06)	3.333 (.761)
Control/Implicit Story Resolution (n = 26)	2.654 (1.13)	3.538 (.811)	3.423 (.703)

score from the story structure free recall measure) found statistically significant differences between the imagery/explicit resolution group and the control/explicit resolution group (t = 2.51; df = 36.55, p = < .01).

The second analysis examined differences between treatment conditions across three measures: reported imagery use, helpfulness of imagery, and enjoyment of story (see Table 2). MANOVA results indicate no significant differences found between treatment conditions (imagery versus control) on the three dependent variables. Univariate analyses indicate a significant difference found between explicit and implicit text versions on two measures. Students reported that images helped them understand better in the implicit text version [$F(1,93) = 8.47, p < .005$]. Students also reported that they enjoyed reading the implicit text version more than the explicit version [$F(1,93) = 5.55, p < .02$]. There were no differences in the number of subjects in each treatment group who reported that they used or did not use imagery [χ^2 (2, N = 100) = .4842, $p > .05$]. Seven out of 47 subjects in the imagery group reported that they did not use

Table 3. Summary of Test of Significance between Imagery Use (reported, not reported) on Story Enjoyment

	M (total possible = 4)	*SD*	*SE*	*t*-Value	*p*[a]
Reported Imagery (n = 79)	3.0886	.536	.060	-2.09	.039
Do No Report Imagery (n = 17)	2.7647	.752	.182	--	--

[a]Two-tailed probability; pooled variance estimate, df = 94

Table 4. Summary of Test of Significance between Imagery Use (reported, not reported on Interest in Story

	M (total possible = 4)	*SD*	*SE*	*t*-Value	*p*[a]
Reported Imagery (n = 79)	2.6835	.793	.089	-3.12	.002
Do Not Report Imagery (n = 17)	2.0000	.935	.227	--	--

[a]Two-tailed probability; pooled variance estimate, df = 94

Table 5. Summary of Tests of Significance between Imagery Use (reported, not reported) on Free Recall Tasks

	M	*SD*	*SE*	*t*-Value	*p*
Delayed Free Recall: Story Setting (possible total score = 4)					
Reported Imagery (n = 79)	3.6582	.766	.086	-2.19	.043[a]
Do Not Report Imagery (n = 17)	2.7059	1.759	.427	--	--
Delayed Free Recall: Minor Plot Episodes (possible total score = 6)					
Reported Imagery (n = 79)	2.4117	1.392	.157	-3.18	.002[b]
Do Not Report Imagery (n = 17)	1.2353	1.393	.338	--	--
Immediate Free Recall: Story Resolution (possible total score = 1)					
Reported Imagery (n = 79)	.5696	.827	.093	-2.95	.005[c]
Do Not Report Imagery (n = 17)	.1765	.393	.095	--	--

[a]Two-tailed probability; separate variance estimate, df = 17.33
[b]Two-tailed probability; pooled variance estimate, df = 94
[c]Two-tailed probability; separate variance estimate, df = 51.46

imagery despite being instructed to do so. Similarly, 40 out of 50 subjects in the control group reported that they used imagery, despite the lack of prompts to do so. A comparison of scores on the California Achievement Test-Reading Comprehension revealed no significant differences between students who reported using imagery and those who reported they did not use imagery (See Tables 3 and 4).

A post hoc analysis was conducted comparing those students who reported using imagery (n = 79) to the students who did not

report using imagery (n = 17). A significant difference in favor of the imagery group was found on enjoyment of the story, t (94) = -2.09, $p < .039$, and on interest in the story, $t(94) = -3.12$, $p < .002$. That is, the imagery group reported greater enjoyment from the story than the group who did not report using images. In addition, students who reported using imagery found the story to be more interesting than those who did not.

Tests of significance between those who reported using imagery versus those who did not report imaging using immediate and delayed free recall scores are reported in Table 5. There were significant differences in favor of the imagery group for delayed recall of story setting [$t(17) = -2.19$, $p < .043$], delayed recall of minor plot episodes [$t(94) = -3.18$, $p < .002$], and immediate recall of story resolution [$t(52) = -2.95$, $p < .005$].

Discussion

The purpose of the study was to examine whether less proficient readers use imagery, and if so, what effects such imagery has on reader responses and comprehension. It has been assumed that less proficient readers would not image unless directed or instructed to do so. Contrary to this belief, the fifth-grade students in this study who were considered less proficient readers used imagery nevertheless. The treatment condition had no effect on whether less proficient readers imaged or not. In other words, it did not matter whether students were instructed to image and prompted on several occasions to use those images in their recalls. Instead, a large portion of students in the control group (40/50) reported using imagery anyway. This finding is supported by earlier imagery studies with adults where the natural tendency to image confounded treatment effects (Walker, Truscott, Gambrell, & Almasi, 1994).

This study found several reported effects of imagery during reading. First, students who reported using imagery found that the images helped them to better understand in the implicit version of the text. This is positive support that imagery can assist the less proficient reader in more difficult types of texts, not just in explicit versions. In addition, students who reported using imagery found the story to be more enjoyable, and these students were more interested in the story than students who did not image. Both enjoyment and interest are crucial aspects in a readers' ability to step into a story and are directly related to accessing and using background knowledge (Long, Winograd, & Bridge, 1989). What is intriguing is that students reported that they enjoyed reading the implicit version more than the explicit version of the story.

In addition, there were some significant differences in favor of the reported imagery group on delayed recall of setting and plot episodes. Those students who reported using imagery comprehended portions of the story longer and better than those who did not use imagery. However, significance did not hold for the delayed recall of story resolution. It could be that certain story elements lend themselves to mental imagery better than others and hence this facilitates students' recall of these story elements.

It appears that it is not a question of whether poor readers can image, but one which examines whether they can *use* this imagery to comprehend abstract concepts or make inferences. This finding is supported by the work of Long, Winograd, and Bridge (1989) which suggests that spontaneous imagery use may not have the effects on reading comprehension that controlled imagery use provides. In this sense, less proficient readers' use of imagery would be dependent on training and instruction in the classroom. In this study, subjects were prompted to image, but received no formal imagery training. Other researchers have shown that imagery training can help poor readers monitor their comprehension (Gambrell & Bales, 1986). Additionally, training has facilitated average fourth-grade readers' comprehension as well as the generation of implicit ideas used for textual elaborations (Konopak et al., 1991).

However, traditional reading responses required for less proficient readers focus more on text-based answers to questions rather than on affective responses. In an effort to keep reading simple, teachers have focused on literal questions where the answers can be found in the text, thus allowing them to provide substantial feedback to the students (Knapp, Shields, & Turnbull, 1992). It is not surprising that by fifth grade, poor readers are more adept at answering literal questions (McCormick, 1989; McCormick, 1992). Thus when making inferences, poor readers tend to use irrelevant text-explicit information and then draw heavily on their background knowledge.

While imagery training may help less proficient readers use their imaging abilities to comprehend better, it does not acknowledge the imagery abilities that students already possess. This study offers support for the acknowledgement and value of an affective response to text. In doing so, we give students opportunities to use their images without the confines of text-based criterion. The study found that when you focused on assessment measures that allowed students more personal freedoms to respond (e.g., interest in story, enjoyment of story, free recall, and text-implicit questions), those students who reported using imagery outperformed those students who did not. On the contrary, when you examine measures which required text-based information (e.g., cued text-explicit recall questions) the imagery effects disappeared. This is not to say that students suddenly stopped imaging, but suggests that *poor readers generally have no avenue to use their images in the language that describes them.*

Finally, poor readers may too often look beyond the comprehension of text and more naturally engage in affective responses to text. In terms of Purcell-Gates (1991) analysis, these readers may not find themselves outside trying to get in, but rather too far inside to be able to verbalize their literary experience. Although their responses appear text-based, this may be due to the parallel coding processes of linguistic and nonlinguistic information (Paivio, 1986). The poor reader may keep these processing systems separate rather than integrating the information from both systems; thus when being asked to verbalize their comprehension, they supply only a brief text-based description. This interpretation seems to fit the notion that poor readers tend to use their background

knowledge excessively when answering interpretive comprehension questions. Perhaps, their affective response is embodied in the imaginal system and they do not code it into the verbal system; thus, they use what little verbal attention they have given to text information to respond to direct questions. Although beyond the scope of this study, it appears that changing the instructional situation to allow poor readers initially to respond aesthetically to text might be more advantageous than the current emphasis on keeping reading simple by asking literal, text-based questions.

In conclusion, the less proficient fifth-grade readers in this study did image, and imaging increased their enjoyment and interest. Further research needs to be conducted on how poor readers respond affectively to text and on the accompanying instructional situation that would promote more active and engaged readers.

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